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ABSTRACT

A set of 58 problems that may be solved by using lists is presented. This set is part of the Mathematical Problem Solving Project. The problems are coded for three levels of difficulty and are designed for students in the intermediate grades. Answers are provided. (MP)

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USING LISTS

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SE 026 920

B 0 1

P	N
10	0
5	1
0	2

P is for pennies
N is for nickels

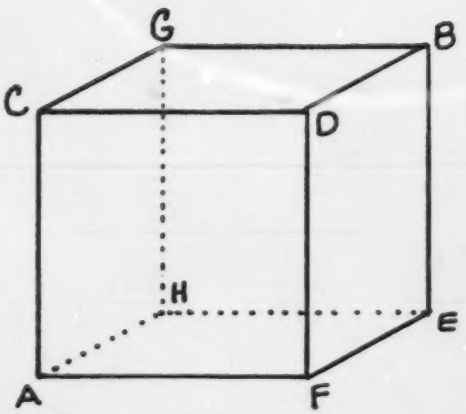
B 0 2 ans. 6

A C D B
A C G B
A F E B
A F D B
A H E B
A H G B

B 0 1

How many ways can you make change for a dime?

B 0 2 An ant crawls from A to B. How many different 3-legged trips can it travel?



Hint: Where do you start?
Where do you end?
From the starting place how many more letters do you go through on a 3-legged trip?

B 0 3

A	B
0	10
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
10	0

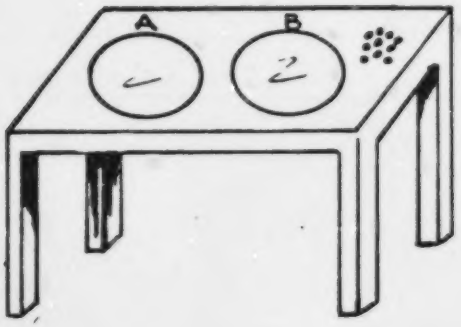
there is a difference in arrangement because the plates are labeled.

B 0 4

1	3	5	7	9		
1	0	0	0	1		
0	1	0	1	0		
3	0	0	1	0	*	7 + 1 + 1 + 1
2	1	1	0	0	*	5 + 3 + 1 + 1
1	3	0	0	0	*	3 + 3 + 3 + 1

B 0 3

You have 10 beans to be placed on two plates labeled A and B. In how many different ways can these beans be placed on the plates? Think of all the ways, including placing all the beans on one of the two plates.



B 0 4 Add 4 odd numbers to get 10. (You may use a number more than once!) How many ways can it be done?

B 0 5

N	D	
1	13	
3	12	
5	11	
7	10	
9	9	
11	8	
13	7	*

N is for nickel
D is for dime

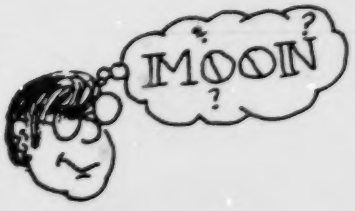
Sum = $1.35

B 0 6

MOON
MONO
MNOO
NOOM
NOMO
NMOO
OMON
ONOM
OMNO
ONMO
OOMN
OONM

B 0 5 Adam has 20 coins worth $1.35. They are all nickels and dimes. How many of each kind of coin does Adam have?

B 0 6 List all the 4-letter words you can make from "MOON."



Hint: Nonsense words are okay. How many words can you make starting with MO? How many starting with MN? Pick another letter to use first.

B 0 7

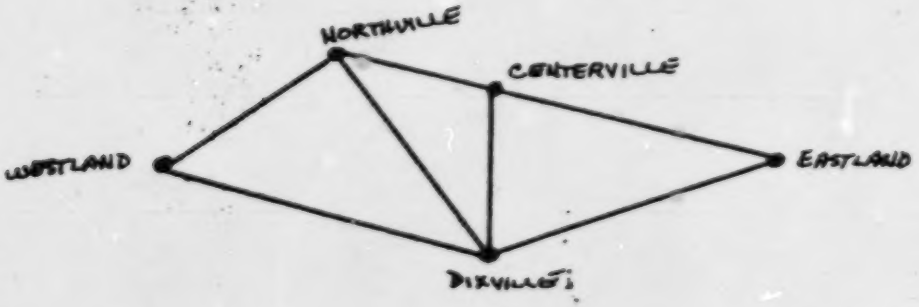
MATH	AMTH	TMAH	HMAT
MTAH	ATMH	TAMH	HAMT
MTHA	ATHM	TAHM	HATM
MAHT	AMHT	TMHA	HMTA
MHTA	AHMT	THMA	HTMA
MHAT	AHTM	THAM	HTAM

B 0 8

WNCE
WNDE
WNDCE
WDE
WDNCE
WDCE
WNCDE

B 0 7 How many ways can you arrange the letters of "MATH" to make new words? (nonsense words permitted)

B 0 8 In preparing for a road rally, Ralph had to find different routes from Westland to Eastland. How many ways could Ralph travel from Westland to Eastland without going through the same city twice on a trip?



Hint: How many ways are there from Northville to Eastland? How many ways from Dixville to Eastland?

B 0 9

1st	2nd	Product	Sum	
1	48	48	49	
2	24	48	26	
3	16	48	19	
4	12	48	16	
6	8	48	14	*

B 0 10

Fred	Hermie	Sum	Difference	
1	14	15	13	
2	13	15	11	
3	12	15	9	
4	11	15	7	
5	10	15	5	
6	9	15	3	*

B 0 9 I am thinking of two numbers. Their sum is 14 and their product is 48. What are the two numbers?

Hint: What are all possible pairs whose product is 48?

B 0 10

Fred and Hermie added their ages and got 15. The difference in their ages is 3. How old are Fred and Hermie?

B 0 11

Q	D	N	P	Number of coins	
1	1	1	3	6	
1	0	3	3	7	
1	0	0	18	19	
0	4	0	3	7	
0	3	2	3	8	
0	3	1	8	12	
0	2	4	3	9	*

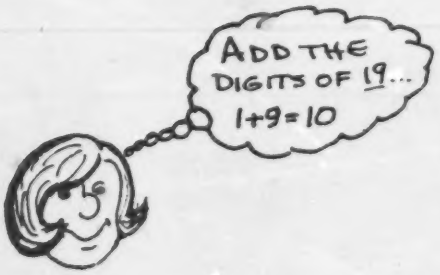
number of coins: 9
value of coins: 43¢

B 0 12

19 ----- 1 + 9 = 10
28 ----- 2 + 8 = 10
37 ----- 3 + 7 = 10
46 ----- 4 + 6 = 10
55 ----- 5 + 5 = 10
64
73
82
91

B 0 11 Bonnie has nine coins in her purse that are worth 43¢. What coins must she have?

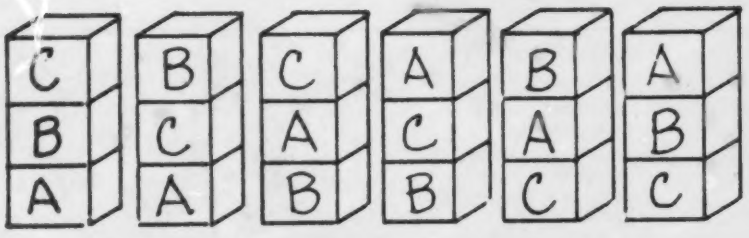
B 0 12 List all the numbers between 1 and 100 that have 10 as the sum of their digits.



B 0 13 ans. 24

P N D Q	N P D Q	D P N Q	Q P N D
P N Q D	N P Q D	D P Q N	Q P D N
P D N Q	N D P Q	D N P Q	Q N P D
P Q N D	N Q P D	D Q P N	Q D P N
P D Q N	N D Q P	D N Q P	Q N D P
P Q D N	N Q D P	D Q N P	Q D N P

B 0 14 ans. 6

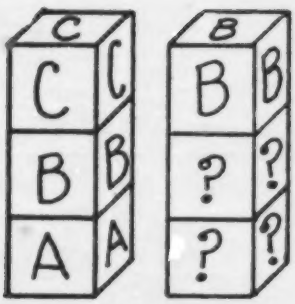


B 0 13

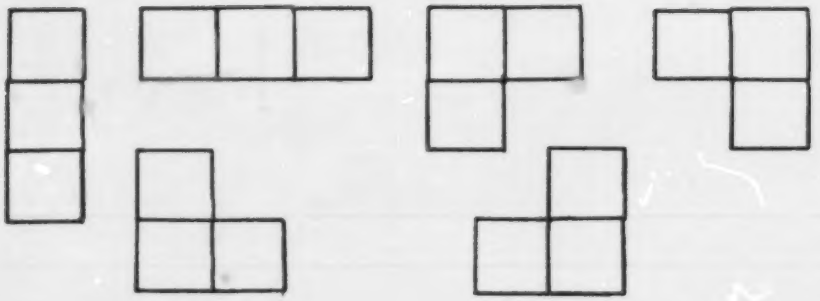
In how many ways can you arrange the order of a penny, nickel, dime, and quarter in a row?

B 0 14

How many ways can these three blocks be stacked on top of each other?



B 0 15 ans. 6



B 0 16

<u>one solution</u>

6 darts

Points

2	6	9	number of darts
2	6	9	1
4	12	18	2
6	18	27	3
8	24	36	4
10	30	45	5
12	36		6
14	42		7
16	48		8
18			9
20			10

<u>another solution</u>

6 darts

Darts used

9	6	2	Total	Points left
3	1	0	33	1
2	2	0	30	4
2	2	2	34	0

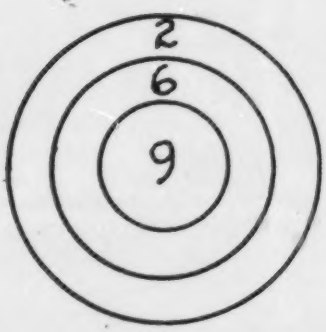
B 0 15

When you buy stamps at the post office, they are usually attached to each other. How many different ways can you buy three attached stamps?

(non-solution:)

B 0 16

Don bet Paula that he could score a total of exactly 34 points on his dartboard. What is the least number of darts needed to score 34?



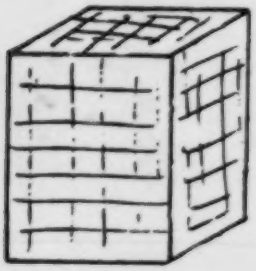
B 0 17

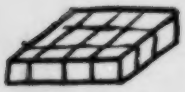
1 x 1 x 12 1 x 3 x 4 1 x 6 x 2 2 x 2 x 3

B 0 18 ans. 24

ABCD	BACD	CABD	DABC
ABDC	BADC	CADB	DACB
ACBD	BCAD	CBAD	DBAC
ACDB	BCDA	CBDA	DBCA
ADBC	BDAC	CDAB	DCAB
ADCB	BDCA	CDBA	DCBA

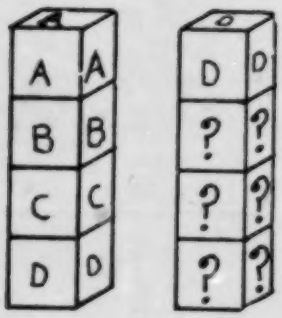
B 0 17 How many different shaped boxes can you fill using 12 cubes?



Example: one way:  12 boxes: 1 layer 4 wide and 3 deep.

B 0 18

How many ways can 4 blocks be stacked on top of each other?



B 0 19

P	N	D
25	0	0
20	1	0
15	2	0
15	0	1
10	1	1
10	3	0
5	2	1
5	0	2
5	4	0
0	1	2
0	3	1
0	5	0

P is for pennies
N is for nickels
D is for dimes

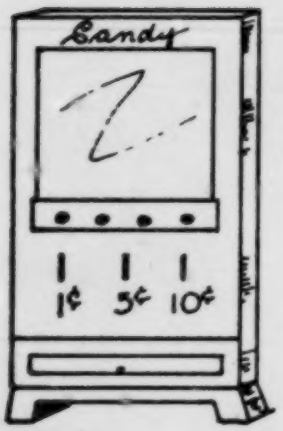
B 0 20

P	N	D
25	0	0
20	1	0
15	2	0
15	0	1
10	1	1
10	3	0
5	2	1
5	0	2
5	4	0
0	1	2
0	3	1
0	5	0

P is for pennies
N is for nickels
D is for dimes

B 0 19 How many ways can you make change for a quarter?

B 0 20



Jan wanted to buy a 25¢ candy bar. The machine had a place for pennies, a place for nickels, and a place for dimes. How many ways could she put coins into the machine in order to pay for her candy?

B 0 21 ans. 6

B 0 21

Joe was reorganizing his stamp collection. He noticed that stamps that he had 3 of, were attached in several different ways. As he thumbed through his collection, he made a note of the different ways he found. How many ways did he discover?

W 0 1

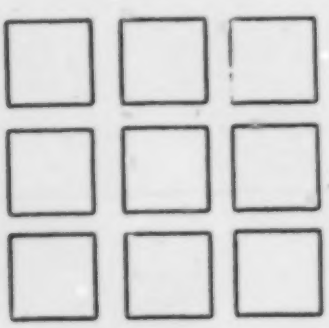
List the ways 10 coins can be used to make change for 59¢.

W 0 2

Place 2,3,4,5,6,7,8,9, and 10 in the squares so the sum of three numbers in any straight line direction is always 18.

Make a list:

1st number	2nd number	3rd number	Sum



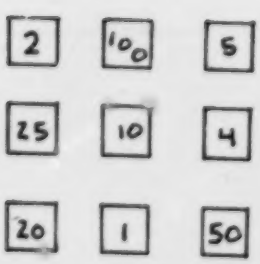
W 0 1

P	N	D	Q	H	
9	0	0	0	1	*
4	1	0	2	0	
9	0	0	2	0	
4	0	3	1	0	
4	2	2	1	0	
9	1	2	1	0	
4	4	1	1	0	*
4	6	0	1	0	
4	1	5	0	0	*
4	3	4	0	0	

At this point it can be seen that 4 pennies will always be needed and that the sum of nickels and dimes will always be greater than 6.

W 0 2

1st num.	2nd num.	3rd num.	Product
100	10	1	1000
100	5	2	1000
50	20	1	1000
50	10	2	1000
50	5	4	1000
25	20	2	1000
25	10	4	1000
20	10	5	1000



W 0 3

Lester had a code. In addition exercise, each letter stands for one of these numbers -- 2, 6, 7, 8

$$\begin{array}{r} PQ \\ PQ \\ +\ PQ \\ \hline RRS \end{array}$$

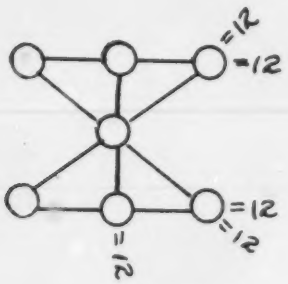
What number does each letter represent?

Hint: If P = 2, what are the possibilities for Q?

If P = 6, what are the possibilities for Q?

W 0 4

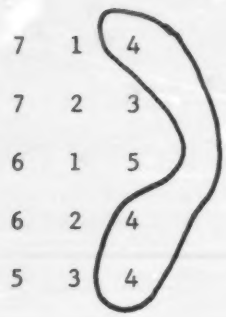
place the numerals 1 through 7 in the circles so that the sum of each 3 circles in a straight line is 12.

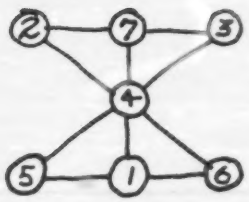


W 0 3 P = 7 Q = 6 R = 2 S = 8

R in hundreds place comes from regrouping, so it must be 2. In regrouping either 1 or 2 is carried. For R in tens place to be 2, a 1 must be carried from adding Q's, forcing P = 7 and Q = 6.

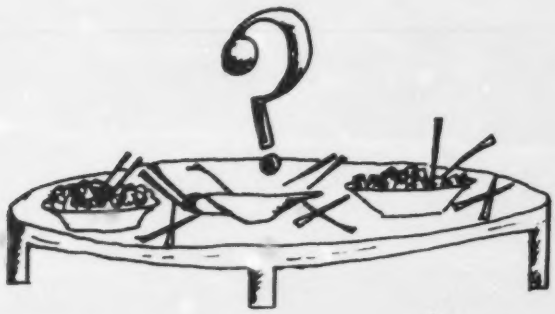
W 0 4





W 0 5

Sue planned for a large Chinese party. What is the least number of guests she planned for if every 2 guests used a dish for rice between them, every 3 used a dish of gravy between them, and every 4 used a dish of meat between them?



W 0 6

How many 4 digit numbers can you make using numbers 1,2,3,4 only once? (Example: 4,321)

W 0 5

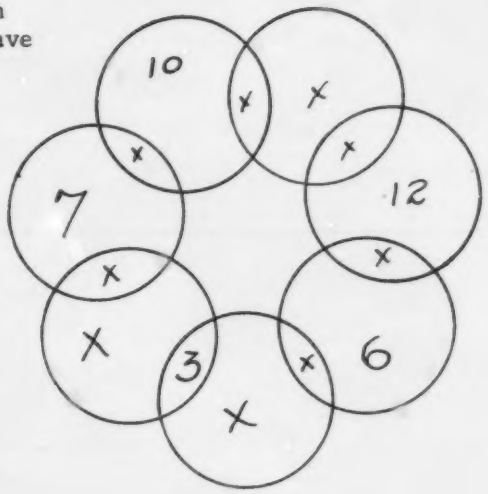
RICE	GRAVY	MEAT
2	3	4
4	6	8
6	9	12
8	12	16
10	15	
12		
14		

Multiples of 2,3,4 would be needed for each food type. Answer is LCM of 2,3,4.

W 0 6

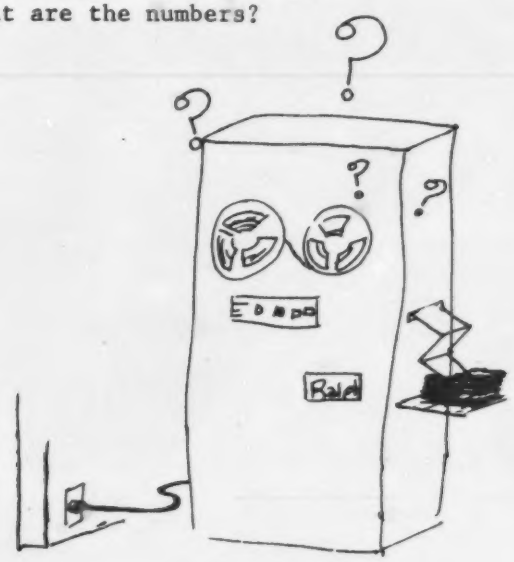
1 2 3 4	2 3 4 1	3 4 1 2	4 3 2 1
1 2 4 3	2 3 1 4	3 4 2 1	4 3 1 2
1 3 2 4	2 1 3 4	3 2 1 4	4 2 3 1
1 3 4 2	2 1 4 3	3 2 4 1	4 2 1 3
1 4 2 3	2 4 1 3	3 1 2 4	4 1 2 3
1 4 3 2	2 4 3 1	3 1 4 2	4 1 3 2

W 0 7 Replace the x's with the numbers 1 through 14 so the sum in each circle is 21. (3,6,7,10,12, have already been put in place.)



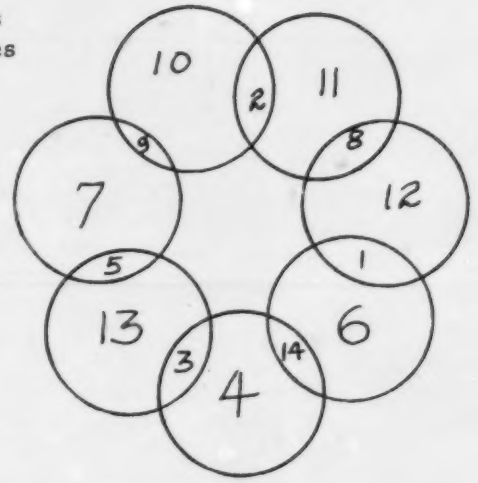
W 0 8 Ralph, the computer, woke up one morning with a headache. He had been trying to figure out this problem. Can you help him?

I am thinking of two numbers whose sum is 35 and their product is 250. What are the numbers?



W 0 7

Begin list using numbers that are found in circles next to each other such as circles A and B.



10 2 9 *
10---3---8
10---4---7
10---5---6
7---1---3
7---2--12
7---3--11
7 5 9 *
7---6---8
12 1 8 *
12---2---7
12---3---6
12 4 5

6 1 14 *
6 2 13
6---3---12
6 4 11
6---5---10
14---2---5
14---3---4

Eliminate triples where placed numbers are not in same circle.

W 0 8

1st	2nd	Prod	Sum	
1	250	250	251	
2	125	.	127	
5	50	.	55	
10	25	250	35	*

W O 9 If Mr. Marra adds ten years to his present age and doubles it, he would be 82. How old is Mr. Marra now?

W O 10 If Mr. Marra added 15 points to Shelly's test grade and multiplied the new number by four, it would equal 352. If 70 is passing, show by listing if Shelly passed the test.

W 0 9

	Present age	add 10	double	answer 82
Guess	20	30	60	No
	21	31	62	No
Skip	30	40	80	No
	31	41	82	Yes

W 0 10

	Grade	add 15	multiply by 4	answer 352
Guess	60	75	300	No
	65	80	320	No
	70	85	340	No
	71	86	344	No
	72	87	348	No
	73	88	352	Yes

She passed because her grade was 73.

W O 11

Mrs. Taylor tried to hide the amount of money she spent on clothes. She told Mr. Taylor that if he took the amount she spent, divided by 4, and then subtracted $20, he would get $5. How much did she spend?

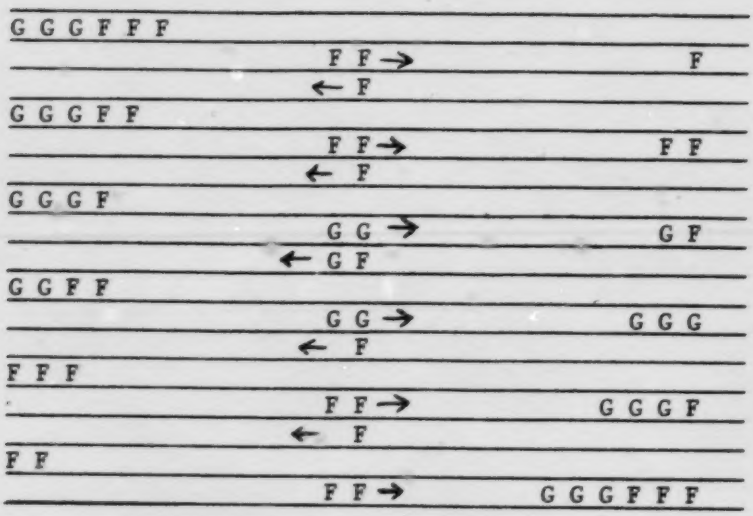
W O 12

Three foxes and three geese had to cross the river on a boat, two at a time. If there were ever more foxes than geese together, the geese would be eaten. How could all of them get across the river?

W O 11

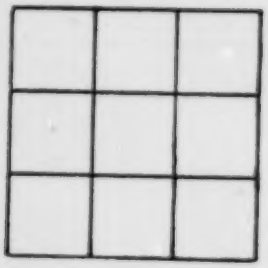
Spent	Divide by 4	Subt. 20	Answer 5	
20	5	can't	no	
80	20	0	no	
100	25	5	yes	*

W O 12



W 0 13

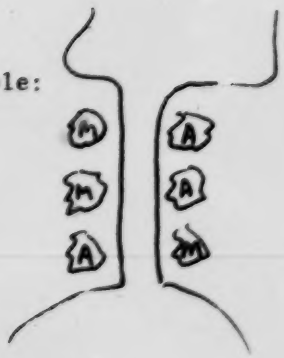
Place the numbers 1 through 9 in the cells so the sum in each direction is 15.



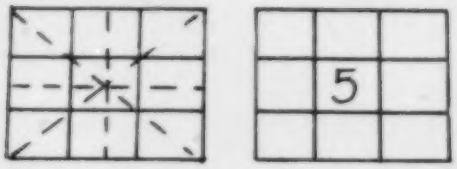
W 0 14

For a school project Boy Scouts and Girl Scouts bought 3 Maple Trees and 3 Apple Trees to line the sidewalk from the parking lot to the school building. They wanted an equal number of trees on each side of the sidewalk. How many different ways can the trees be arranged along the sidewalk?

Example:



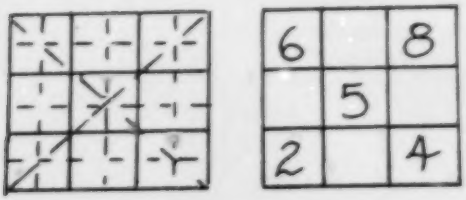
5 is used most often in list



W O 13

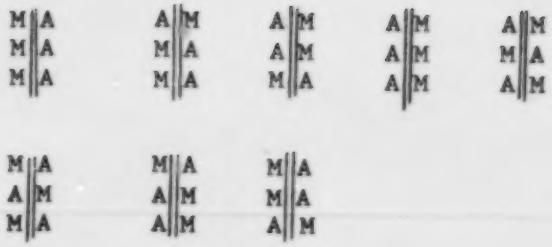
1 + 9 + 5
1 + 8 + 6
2 + 9 + 4
2 + 8 + 5
2 + 7 + 6
3 + 8 + 4
3 + 7 + 5
4 + 6 + 5

The corners are used 3 times: 6,8,4,2



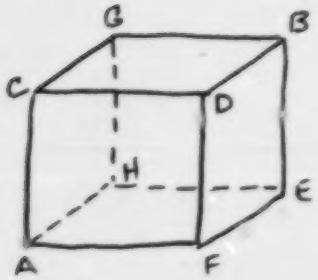
Complete Solution:

W O 14



W O 15

How many different 5-legged trips can an ant make in crawling from A to B?



Hint: Starting at A, how many letters can you go to?

From F how many ways can you go?

How many letters does it take to make a trip?

W O 16

The license plate on Vicki's Vega has three digits. Their product is 216 and their sum is 19. What are the three digits?

W O 15

A C G H E B
A C D F E B
A F D C G B
A F E H G B
A H G C D B
A H E F D B

W O 16

1st	2nd	3rd	Product	Sum
3	9	8	216	20
6	6	6	216	18
6	4	9	216	19

G 0 1

H	Q	D	N	P	
1	1	4	0	0	= 1.15 *
1	1	3	1	0	= 1.10
1	1	2	1	0	= 1.00

The rules say the man cannot make change for a dollar, so 2 half dollars cannot be used.

Also, he cannot have pennies because 5 would be needed but it would change a nickel.

G 0 2

ans. 12 ways

1	3	5	7	9	11	13	15	17	19
7						1			
6	1				1				
6		1		1					
6			2						
5	2			1					
5	1	1	1						
5	0	3							
4	3		1						
4	2	2							
3	4	1							
2	1	3							
2	6								

G 0 1

A man has $1.15 made up of 6 American coins. He cannot make change for a dollar, a half dollar, a quarter, a dime, or a nickel. Which 6 coins does he have?

G 0 2 How many ways can you add 8 odd numbers to get 20? (You may use a number more than once!)

G 0 3

901	505	307	253	19
910	550	370	235	91
802	541	361	244	82
820	514	316	109	28
811	523	352	190	73
703	532	325	181	37
730	406	343	118	64
721	460	334	172	46
712	451	208	127	55
604	415	280	163	
640	442	271	136	
631	424	217	154	
613	433	262	145	
622		226		

G 0 4

6	3	1
5	0	3
5	1	0
4	3	2
4	0	3
3	3	4
3	0	5
2	0	7
1	0	9
0	0	11

or

6	3	1
5	0	3
5	1	0
4	2	3
3	4	3
3	5	0
2	7	0
1	9	0
0	11	0

G 0 3 You are a contestant waiting backstage to appear on a new game show. You know the stage will be filled with prizes with price tags from $1.00 to $1,000. You will be allowed to keep each prize with a price tag whose digits add up to 10. You will be given one minute to find the prizes, so you decide to make a list. How many prizes will you take home? What will be the least expensive prize? What will be the most expensive prize?

G 0 4 During a recent football game your team scored 33 points. What are the different ways these 33 points could have been made?

Touchdown - 6
Point after - 1
Field goal - 3

G 0 5

By 2's	By 3's	By 5's
3	4	6
5	7	11
7	10	16
9	13	21
11	16	26
13	19	31
15	22	36
17	25	
19	28	
21	31	
23	34	
25		
27		
29		
31		
33		

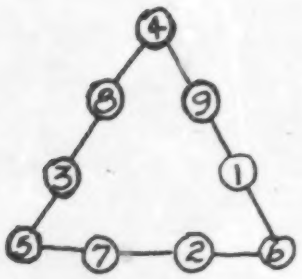
The list consists of the multiples + 1 of each number.

A shorter solution, not requiring a list, is one more than the LCM of the three numbers. (2·3·5 + 1)

G 0 6

9	8	2	1	
9	7	3	1	
9	6	4	1	*
9	6	3	2	
9	5	4	2	
8	7	4	1	
8	7	3	2	
8	6	5	1	
8	6	4	2	
7	6	5	2	*
7	6	4	3	
5	4	8	3	*

Sum = 20



This is one solution. Each vertex number is used twice. After the list is made, find 3 numbers that appear in two sets. (Two numbers should not appear in the same two sets, such as 9 and 9 in 9641, 9632.) These will be the vertex numbers, and the remaining will fit into place easily.

G 0 5

A packing expert trains his packing crew on the following problem. Could you make it on his crew?

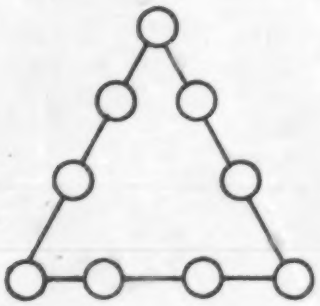
Place marbles in the box by 2's, then 3's, then 5's. Each time there is one marble left over.

What is the smallest number of marbles possible to be able to do this?

Hint: List the different amounts of marbles if they are put in the box by 2's and 1 is left over: 3, 5, ...
Do the same for 3's.

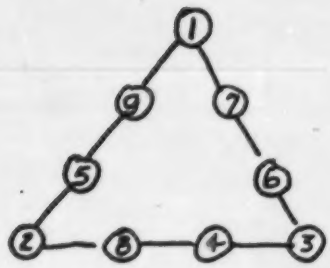
G 0 6

Place the numerals 1 through 9 in circles so the sum of each side is 20.



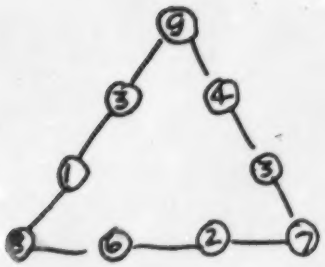
G 0 7

9	5	2	1	* sum = 17
9	4	3	1	
8	6	2	1	
8	5	3	1	
8	4	3	2	*
7	6	3	1	*
7	5	4	1	
7	5	3	2	
6	5	4	2	

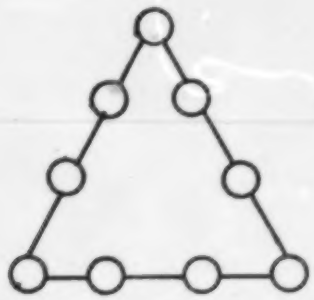


G 0 8

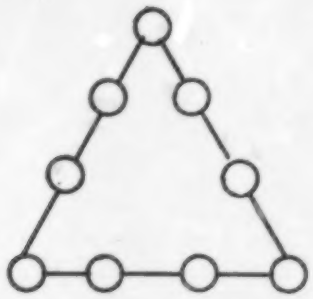
9	8	5	1	* sum = 23
9	8	4	2	
9	7	6	1	
9	7	5	2	
9	7	4	3	*
9	6	7	1	
9	6	5	3	
8	7	6	2	*
8	7	5	3	
8	6	5	4	



G 0 7 Place the numerals 1 through 9 in the circles so the sum of each side is 17.



G 0 8 Place the numerals 1 through 9 in the circles so the sum of each side is 23.



G 0 9

H H H H C C		
H H H H	C C→	C C
H H H H C	← C	C
H H H C	H→	H C
H H H C C	←C	H
H H H	C C→	H C C
H H H C	←C	H C
H H C	H→	H H C
H H C C	←C	H H
H H	C C→	H H C C
H H C	←C	H H C
H C	H→	H H H C
H C C	← C	H H H
H	C C→	H H H C C
H C	←C	H H H C
C	H→	H H H H C
C C	← C	H H H H

G 0 10

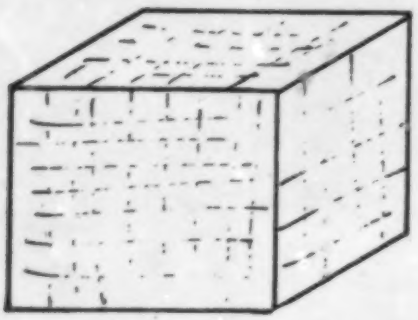
L	W	H
1	1	24
1	2	12
1	3	8
1	4	6
2	2	6
2	3	4

G 0 9

Four hikers came to a wide river. The only way they could cross the river was in a small boat owned by two children. The boat would hold both children or one hiker. It would not hold a hiker and a child and it would not hold two hikers. How did the hikers cross the river using only one boat?

G 0 10

How many different ways can you make a right prism (rectangular solid) from 24 cubes?



G O 11

Each of the letters in this example stands for a numeral. If the letters in the words SEND and MORE were added and the result was the sum MONEY, what numeral does each letter represent? Remember, a letter always stands for the same numeral.

```
 SEND
+MORE
-----
MONEY
```

G O 12

Mr. Jones was taking the yearly census. He was told that 3 people live in the red brick house at the end of the street. He found out that the product of their ages was 1296, and the sum of their ages was 40. None of the members of the household was older than Mr. Jones, and he was 21. Complete the census by writing the ages of each person.

G 0 11

SEND	9567
+ MORE	+ 1085
MONEY	10652

G 0 12

Try numbers 21 or less that will divide 1296 evenly.

1st	2nd	3rd	Sum	
18	72	1	91	
18	36	2	56	
18	24	3	45	
18	18	4	40	*

G O 13 Three boys sit in a row, one behind the other.

Sue has 5 hats (3 red, 2 green). While the boys had their eyes closed, Sue placed hats on their heads and hid the rest. After opening their eyes, neither Dick nor Tom could tell which color their hat was. Then Harry said his was red. How could he tell? (Hint: List the possible colors of hats that each could have on their heads. Then ask yourself: What can Tom see? What can Dick see?

G O 14

Before recess three boys counted their marbles. Each boy found his count to be a prime number. The sum of the numbers was 101.

At recess each boy won 6 marbles. Each still had a count that was a prime number. Two boys found their sum to be 100.

How many marbles did each boy have at the start?

G 0 13

Tom	Dick	Harry	
R	R	R	
R	R	G	Y
R	G	R	
G	R	R	
R	G	G	X
G	R	G	Y
G	G	R	

Tom could not tell his color. This means Dick and Harry both did not have green. (X marks those eliminated.)

Dick could not tell his color. This means Harry does not have green. If Harry had green, Tom's remark that both Dick and Harry did not have green would have told Dick he had red. So, Harry must have on red. (Dick eliminated those marked Y.)

G 0 14

(1) Primes	(2) Prime + 6 = Prime	Sum from column (2) = 100	Sum from column (1) = 101
2			
3			
5	11		
7	13		
11	17		
13	19		
17	23		
19			
23	29		
29			
31	37		
37	43		
41	47		
43			
47	53	53 + 47	47 + 41 + 13
53	59		
59			
61	67		
67			
71			
73	79		
79			
83	89	89 + 11	83 + 13 + 5
89			
97	103		
101			

Solutions

47, 41, 13
and
83, 13, 5

G 0 15 There are teams of one boy and one girl each for the school olympics. So far, 53 students have signed up. When the number of boys is multiplied by the number of girls, you get 700. If there are more boys than girls, how many teams can you make? How many more girls need to sign up if every boy is to have a partner?

G 0 16 If one person rolls two dice, many pairs of numbers are possible to add to get the sum of the two dice. Which of the following is most likely?

A. the sum of the dice is 7

B. " " " " " " 5

C. " " " " " " 9

G 0 15

Girls	Boys	B x G	Sum	
1	700	700	701	
2	350	·	352	
4	175	·	179	
5	140	·	145	
7	100	·	107	
10	70	·	80	
14	50	·	64	
20	35	·	55	
25	28	700	33	*

25 girls, 28 boys.
There are 25 teams;
3 more girls are needed.

G 0 16

2nd DIE \ 1st DIE	1	2	3	4	5	6
6	7	8	9	10	11	12
5	6	7	8	9	10	11
4	5	6	7	8	9	10
3	4	5	6	7	8	9
2	3	4	5	6	7	8
1	2	3	4	5	6	7

Table of sums for two dice.

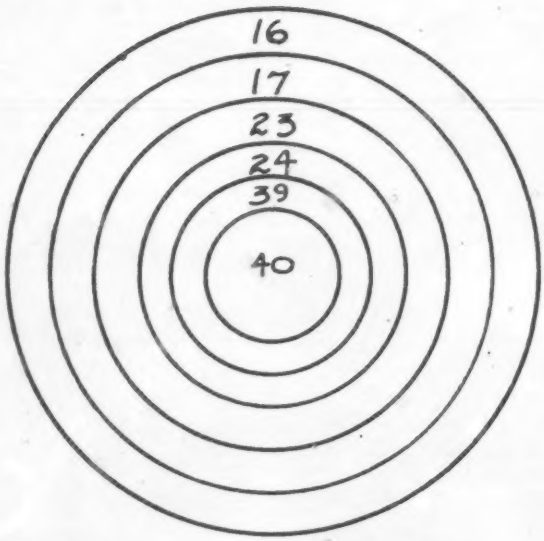
There are 36 possible sums.

Possibilities for 7 is 6
5 is 4
9 is 4

7 is the most likely sum.

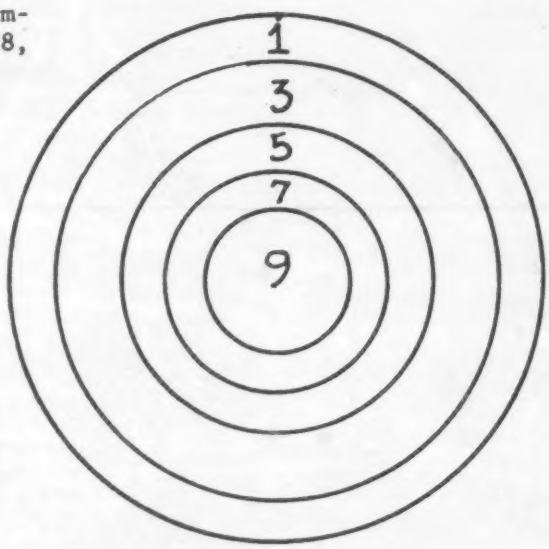
G O 17

Don bet Paula that he could score a total of exactly one hundred before she could on the dart board. What is the least number of darts Don needs to reach his goal?



G O 18

John was taking archery. One day he shot 6 arrows. Each hit the scoring area of the target. Which of the following numbers could have been his score: 17, 28, 5, 56, 35.



Hint: What is the smallest score John could get?

What is the largest possible score?

G 0 17

Target Scores

sums of darts	16	17	23	24	39	40
	16	17	23	24	39	40
	32	34	46	48	78	80
	48	51	69	72	117	120
	64	68	92	96		
	80	85	115	120		
	96	102				

ans. 6 darts

4 in 17, 2 in 16

G 0 18

1	3	5	7	9
1	3	5	7	9
2	6	10	14	18
3	9	15	21	27
4	12	20	28	36
5	15	25	35	45
6	18	30	42	54

Score

17 : No
28 : 1 in 3, 5 in 5
5 : No
56 : No
35 : No

G 0 19

$$\begin{array}{r} IS \\ +\ SS \\ \hline TEE \end{array}$$

I = 4
S = 5
T = 1
E = 0

Since S + S is the same as S + I, 1 must be carried from the one's column to the ten's column.

The only value S could be to require regrouping is 5. S + S = E
5 + 5 = 10

Then I must be 4 I + S + Carry = E
4 + 5 + 1 = 10

$$\begin{array}{r} 45 \\ +\ 55 \\ \hline 100 \end{array}$$

G 0 20

S	Safety	F	Field Goal	T	Touchdown	P	Point after
15		3		0		0	
13		0		1		1	
12		3		0		0	
12		1		1		0	
10		0		2		1	
10		2		1		1	
9		1		2		0	
9		3		1		0	
9		5		0		0	
8		1		2		2	

7	0	3	1
7	2	2	1
7	4	1	1
6	0	3	3
6	1	3	0
6	3	2	0
6	5	1	0
6	7	0	0
5	1	3	2
5	3	2	2
4	0	4	1
4	2	3	1
4	4	2	1

4	6	1	1
3	1	4	0
3	0	4	3
3	3	3	0
3	2	3	3
3	5	2	0
3	7	1	0
3	9	0	0
2	1	4	2
2	3	3	2
2	5	2	2
1	0	5	1
1	2	4	1

1	1	4	4
1	4	3	1
1	6	2	1
1	8	1	1
0	0	5	1
0	3	4	0
0	2	4	3
0	5	3	0
0	4	3	3
0	7	2	0
0	9	1	0
0	11	0	0

G 0 19

Sue had a code where letters were used for numbers. Each letter in the addition exercise stands for one of these numbers -- 0, 1, 4, 5

```
  IS
+ SS
-----
 TEE
```

What number does each letter represent?

G 0 20

Our flag football team scored 33 points. How many different ways could 33 points be scored if:

a. a touchdown is worth 6 points

b. the point after is worth 1 point

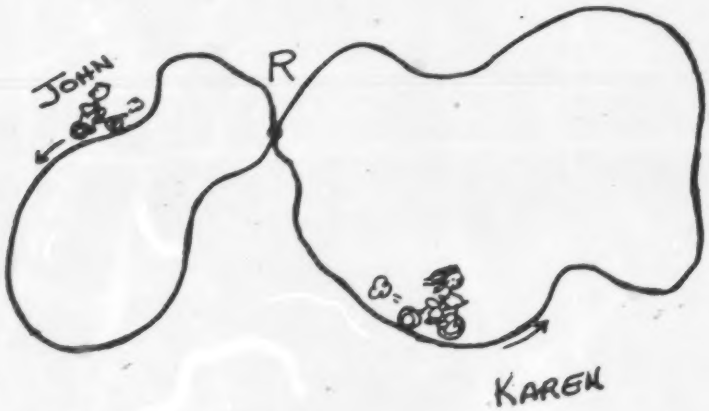
c. a field goal is worth 3 points

d. a safety is worth 2 points

Remember that a point after can only be scored after a touchdown. List the point combinations in each possibility.

G O 21

Behind John and Karen's house are two mini-bike tracks. It takes John 12 seconds to complete each lap. Karen completes a lap every 15 seconds. If they both start at point R at the same time, how many seconds will it be before they meet at Point R?



G O 21

Laps	Minutes to reach R: John	Karen
1	12	15
2	24	30
3	36	45
4	48	60
5	60	

They will meet in 60 seconds.